Public Involvement/Participation

Regulatory Text

You must, at a minimum, comply with state, tribal, and local public notice requirements when implementing a public involvement/participation program.

Guidance

EPA recommends that the public be included in developing, implementing, and reviewing your storm water management program, and that the public participation process should make efforts to reach out and engage all economic and ethnic groups. Opportunities for members of the public to participate in program development and implementation include serving as citizen representatives on a local storm water management panel, attending public hearings, working as citizen volunteers to educate other individuals about the program, assisting in program coordination with other pre-existing programs, or participating in volunteer monitoring efforts. (Citizens should obtain approval where necessary for lawful access to monitoring sites.)

BMP Fact Sheets

Activities/public participation

Storm drain stenciling

Stream cleanup and monitoring

Volunteer monitoring

Reforestation programs

Wetland plantings

Adopt-A-Stream programs

Involvement/public opinion

Watershed organization

Stakeholder meetings

Attitude surveys

Community hotlines

Activities/public participation

Storm Drain Stenciling

Public Involvement/Participation

Description

Storm drains can be labeled with stencils to discourage dumping

Storm drain stenciling involves labeling storm drain inlets with painted messages warning citizens not to dump pollutants into the drains. The stenciled messages are generally a simple phrase to remind passersby that the storm drains connect to local waterbodies and that dumping pollutes those waters. Some specify which waterbody the inlet drains to or name the particular river, lake, or bay. Commonly stenciled messages include: "No Dumping. Drains to Water Source," "Drains to River," and "You Dump it, You Drink it. No Waste Here." Pictures can also be used to convey the message, including a shrimp, common game fish, or a graphic depiction of the path from drain to waterbody. Communities with a large Spanish-speaking population might wish to develop stencils in both English and Spanish, or use a graphic alone.

Applicability

Municipalities can undertake stenciling projects throughout the entire community, especially in areas with sensitive waters or where trash, nutrients, or biological oxygen demand have been identified as high priority pollutants. However, regardless of the condition of the waterbody, the signs raise awareness about the connection between storm drains and receiving waters and they help deter littering, nutrient overenrichment, and other practices that contribute to nonpoint source pollution. Municipalities should identify a subset of drains to stencil because there might be hundreds of inlets; stenciling all of them would be prohibitively expensive and might actually diminish the effect of the message on the public. The drains should be carefully selected to send the message to the maximum number of citizens (for example, in areas of high pedestrian traffic) and to target drains leading to waterbodies where illegal dumping has been identified as a source of pollution.

Implementation

Municipalities can implement storm drain stenciling programs in two ways. In some cases, cities and towns use their own public works staff to do the labeling. Some municipalities feel that having their own crews do the work produces better results and eliminates liability and safety concerns. More commonly, stenciling projects are conducted by volunteer groups in cooperation

with a municipality. In such an arrangement, volunteer groups provide the labor and the municipality provides supplies, safety equipment, and a map and/or directions to the drains to be stenciled. The benefits of using volunteers are lower cost and increased public awareness of storm water pollutants and their path to waterbodies. A municipality can establish a program to comprehensively address storm drain stenciling and actively recruit volunteer groups to help, or the municipality can facilitate volunteer groups that take the initiative to undertake a stenciling project.

Whether the municipality or a volunteer group initiates a stenciling project, the municipality should designate a person in charge of the storm drain stenciling program. Many municipalities will designate a person from the pubic works or water quality department to coordinate stenciling projects by volunteer groups. Because these programs depend heavily on volunteer labor, organizers and coordinators should be skilled in recruiting, training, managing, and recognizing volunteers. Coordination activities include providing

- Stenciling kits containing all materials and tools needed to carry out a stenciling project
- A map of the storm drains to be stenciled
- Training for volunteers on safety procedures and on the technique for using stencils or affixing signs
- Safety equipment (traffic cones, safety vests, masks and/or goggles for spray paint, and gloves if glue is used)
- Incentives and rewards for volunteers (badges, T-shirts, certificates).

The coordinator might also wish to provide pollutant-tracking forms to collect data on serious instances of dumping. Participants in storm drain stenciling projects can be asked to note storm drains that are clogged with debris or show obvious signs of dumping. This enables city crews to target cleanup efforts. Volunteers should be instructed on what kinds of pollutants to look for and how to fill out data cards. Volunteers also should record the locations of all storm drains labeled during the project, so the city can keep track. Additionally, the participants should convene after the event to talk about what they have found. Their reactions and impressions can help organizers improve future stenciling projects.

If a municipality chooses to initiate a storm drain stenciling program and solicit the help of volunteer organizations, they can advertise through a variety of channels. Outreach strategies include

- Distributing pamphlets and brochures to area service organizations
- Placing articles in local magazines
- Taking out newspaper ads
- Placing an environmental insert in the local newspaper
- Making presentations at community meetings
- Developing public service announcements for radio
- Creating a web site with background and contact information as well as photos and stories from past stenciling events (the references section contains a list of storm drain stenciling web sites from communities across the country)
- Using word-of-mouth communications about the program.

Newspapers can be notified to get advance coverage of a planned stenciling event. Newspapers might choose to cover the event itself as an environmental feature story to further public awareness. A news release issued for the day of the event can draw TV and/or newspaper coverage. Public service announcements made before the event also will help to reinforce the message. Additionally, some municipalities can have volunteers distribute door hangers in the targeted neighborhoods to notify residents that storm drain stenciling is taking place. The hangers explain the purpose of the project and offer tips on how citizens can reduce urban runoff in general.

For any volunteer project to be successful, volunteers must feel they have done something worthwhile. Communities active in storm drain stenciling have developed a variety of ways to recognize volunteers, including

- Providing each participant with a certificate of appreciation and/or letter of thanks signed by the mayor
- Distributing logo items such as T-shirts, hats, badges, plastic water bottles, or other items to participants before or after the event
- Holding a picnic or small party after the event with refreshments donated by a local business
- Providing coupons for free pizza, hamburgers, ice cream, or movies donated by local merchants
- Taking pictures of stenciling teams before, during, and after the event to create a pictorial record of volunteers' activity.

Since stenciling projects take place on city streets, volunteer safety is of utmost importance. The city might wish to designate lower-traffic residential areas as targets for volunteer stenciling and provide safety equipment and training. Most programs require that stenciling be done in teams, with at least one person designated to watch for traffic. Adult supervision is needed when volunteers are school children or members of youth groups. Most cities also require participating volunteers (or their parents) to sign a waiver of liability. An attorney for the municipality should be consulted to determine what liability exists and how to handle this issue.

Materials

Most communities use stencils and paint to label their storm drains. Some communities stencil directly onto the curb, street, or sidewalk, while others first paint a white background and then stencil over it. The most commonly used stencils are made of Mylar, a flexible plastic material that can be cleaned and reused many times. However, stencils can also be made from cardboard, aluminum, or other material. The reference section lists web sites where stencils can be purchased.

Storm drain messages can be placed flat against the sidewalk surface just above the storm drain inlet, while others are placed on the curb facing the street or on the street itself, either just upstream of the storm drain or on the street in front of the drain. However, messages placed on the street might wear out sooner.

Paint or ink can be sprayed on or applied by brush and roller. Spray paint is quickest and probably the easiest to apply neatly. Regions that do not meet federal air-quality standards should avoid using spray paints, since many contain air-polluting propellants. It is recommended to use "environmentally friendly" paint that contains no heavy metals and is low in volatile organic compounds.

Alternatives to painted messages include permanent signs made of aluminum, ceramic, plastic, or other durable materials. These signs last longer than stenciled messages and need only glue to affix them to storm drain inlets. They might also be neater and easier to read from a distance. Tiles or plaques can be dislodged by pedestrian traffic if they are disturbed before the glue dries.

Benefits

Storm drain stenciling projects offer an excellent opportunity to educate the public about the link between the storm drain system and drinking water quality. In addition to the labeled storm drains, media coverage of the program or stenciling event can increase public awareness of storm water issues. Volunteer groups can provide additional benefits by picking up trash near the stenciled storm drains and by noting where maintenance is needed. Additionally, stenciling projects can provide a lead-in to volunteer monitoring projects and increase community participation in a variety of other storm water-related activities.

Limitations

A storm drain stenciling program is generally effective, inexpensive, and easy to implement. However, larger communities can have many storm drain inlets, so volunteer coordinators need to be skilled at recruiting and organizing the efforts of volunteers to provide adequate coverage over large areas. Safety considerations might also limit stenciling programs in areas where traffic congestion is high. Other environmental considerations such as the use of propellants in spray paint in areas that do not meet air quality standards should be taken into account. Finally, stencils will require repainting after years of weather and traffic, and tiles and permanent signs might need replacement if they are improperly installed or subject to vandalism.

Effectiveness

By raising public awareness of urban runoff, storm drain stenciling programs should discourage practices that generate nonpoint source pollutants. As with any public education project, however, it is difficult to precisely measure the effect that storm drain stenciling programs have on human behavior. Nor is it easy to measure reductions in certain components of urban runoff, which by definition is diffuse in origin.

Some municipalities attempt to assess the effectiveness of storm drain stenciling programs by periodically examining water samples from targeted storm drain outfalls (places where storm drains empty into a waterbody). If the storm drains leading to a particular outfall have been labeled, and if the levels of pollutants from that outfall decline after the stencils were put in place, one can assume the labeling has had some deterrent effect. This monitoring can be conducted by the same volunteer groups that stenciled the drains and can be incorporated into existing volunteer monitoring programs or can initiate the development of a new program.

Cities also infer stenciling program success from increases in the volume of used motor oil delivered to used-oil recycling centers. Others measure success in terms of how many drains are stenciled and the number of requests received by volunteer groups to participate in the program. They can also take into consideration the number of cleanups conducted by the city as a result of reports made by volunteers.

Costs

Mylar stencils cost about 45 cents per linear inch and can be used for 25 to 500 stencilings, depending on whether paint is sprayed or applied with a brush or roller. Permanent signs are generally more costly: ceramic tiles cost $5 to $6 each and metal stencils can cost $100 or more.

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Stream Cleanup and Monitoring
Public Involvement/Participation

Description

People can become involved in pollution prevention by volunteering to clean up streams (Source: Water Action Volunteers, 1998)

An effective way to promote storm water awareness is to host a stream cleanup. Many people are unaware that most storm drains discharge untreated waters directly into local waterbodies. A stream cleanup allows concerned citizens to become directly involved in water pollution prevention. Participants volunteer to walk (or paddle) the length of the stream or river, collecting trash and recording information about the quantity and types of garbage that has been removed. Stream cleanups also educate members of the community about the importance of stream water quality through media coverage and publicity efforts. Many programs have experts on hand at the event to discuss the stream's ecology and history. As a result, the river is cleaner, volunteers feel a sense of accomplishment, and the community at large is better informed.

Applicability

Stream cleanups are applicable to all waterbodies. Almost anyone can get involved in cleanup activities: schoolchildren, youth groups, neighborhood associations, local environmental groups, and individuals. Cleanups have tasks of varying levels of difficulty, so there is something for people of all ages and skills to do.

Implementation

Municipalities should consider designating an individual or groups of individuals to schedule and organize the cleanup projects, recruit volunteers, coordinate trash disposal with the local solid waste authority, and assign staff for supervision of the projects. Projects should be scheduled several months in advance to provide adequate time to organize volunteers and handle logistical issues. Permission to conduct cleanup projects on private property should be secured in advance.

The first step for a municipally sponsored stream cleanup program is to identify cleanup sites. Data from monitoring activities, including volunteer monitoring, can identify particular stream reaches that are heavily impacted by trash, especially streams near commercial and residential areas that experience high vehicular and pedestrian traffic.

Stream reaches can be prioritized based on the goals of the watershed program. Some communities might target high-visibility or easily accessible areas for maximum convenience and exposure, while others might target the most ecologically sensitive reaches for cleanup efforts.

Once candidate stream reaches have been identified, municipalities should determine the level of effort needed for each project with respect to the size and experience of the group and equipment and supervision needs. A survey should be conducted to identify particular spots where the cleanup effort should concentrate and especially dangerous spots that volunteers should avoid.

Another task for the municipal stream cleanup coordinator is to advertise the program and let service groups know about cleanup project opportunities. Ads can be placed in newsletters, newspapers, and utility bill inserts or posted on the municipal web site. Also, public service announcements can be distributed to radio and television stations. The coordinator can solicit known service groups, environmental organizations, schools, and other groups likely to participate.

Once volunteers are signed up for an event, information should be distributed to them, including meeting times, recommendations for clothing and footwear, inclement weather contingencies, and any other pertinent information. The Arlingtonians for a Clean Environment posted this information for their cleanup activities in the form of frequently asked questions at their web site (*www.capaccess.org/nnp/arclen/streamtips.htm*).

When volunteers are being used for cleanup efforts, municipalities must address the issue of liability. An attorney should be consulted to determine how liability should be handled and draft a waiver for volunteers to sign before participating. Volunteer safety should be maximized by providing safety vests and an adequate number of staff members for supervision based on the type of volunteers used (i.e., many more staff would be needed to assist a school group compared to a group of adults). Volunteers should be provided with, or be encouraged to bring, durable gloves and to wear shoes with adequate tread. First aid kits should be kept nearby during the cleanup project. If cleanups are located along a roadside, the area should be clearly marked with signs, flags, and cones to alert passing motorists.

The municipality should identify a disposal site for the collected garbage. The local solid waste authority can pick up the bagged garbage at the cleanup site or it can be taken to the disposal facility by volunteers or municipal employees. Recyclable materials should be separated from trash and taken to a local recycling center.

When the cleanup effort is complete, volunteers should be recognized for their work. Participation certificates, T-shirts, cups, and other promotional items are always appreciated awards. Also, lunch can be provided through donations from local businesses.

Effectiveness

Stream cleanup events are an effective way to improve habitat, water quality, and aesthetics. To maintain water quality, cleanup efforts must be recurring; a one-time-only cleanup event might raise awareness in the community, but it will not keep trash out of the river. Seasonal or annual cleanup events will help make sure that trash and debris are kept out of the river as much as possible. Volunteer groups can be encouraged to establish Adopt-A-Stream programs to provide for repeated cleanups at a particular site or set of sites.

Cleanup events are also effective at increasing public awareness of pollutant sources and fates, especially when knowledgeable municipal staff are on hand to answer questions, describe the Additionally, all of the information collected at the cleanup sites, including how much of each type of trash was found, can be compiled and presented to the public to inform them about the significance of stream cleanup activities.

A stream cleanup program's effectiveness can be expanded if volunteers report problems such as clogged outfalls, debris too large for volunteers to move, areas of excessive streambank erosion, and signs of illegal dumping. This information will help a municipality to better target their maintenance efforts.

Benefits

Cleanup efforts benefit both the waterbody and the community. These efforts help citizens feel more involved in their community and foster a sense of responsibility for the water resources in their community. In addition, the cleanup efforts improve aesthetics, habitat, and water quality. In addition to trash and debris removal, media coverage of the program or cleanup event can increase public awareness of storm water issues. Volunteer groups can provide additional benefits by taking note of areas where maintenance is needed. Additionally, cleanups can provide a lead-in to volunteer monitoring projects and increase community participation in a variety of other storm water-related activities.

Limitations

Organization at the municipal level is a limitation to cleanup efforts. Some municipalities do not have the resources to designate staff to oversee a cleanup program and to supervise cleanup activities. Municipalities constrained by financial and staffing considerations can seek partnerships with other community and environmental groups to develop a program that relieves the municipality of the burden of organization while providing the volunteer groups with the authority to access both public and private (with permission) lands and equipment for trash collection and hauling.

Other limitations to an effective cleanup program are volunteer interest and commitment. In some cases municipalities must actively solicit community and environmental groups to participate in cleanup projects. The municipal staff in charge of organizing these events should be skilled in volunteer recruiting as well as in advertising the event to maximize participation and exposure via the media.

Cost

Stream and river cleanup activities are typically inexpensive since volunteer labor is used. The supplies required for these efforts—durable gloves, garbage bags, and clipboards for recording information—are generally easy to find, are not costly, and may be donated by local businesses, further reducing costs. Collection of the garbage may require some additional expense, but municipal equipment can be used to facilitate transport of the trash.

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Volunteer Monitoring
Public Involvement/Participation

Description


A group of volunteers monitors a stream to obtain water quality information

Volunteer monitoring programs encourage citizens to learn about their water resources. These volunteer monitors

- Build awareness of pollution problems
- Become trained in pollution prevention
- Help clean up problem sites
- Provide data for waters that might otherwise be unassessed
- Increase the amount of water quality information available to decision makers at all levels of government.

The volunteers often become educators themselves, informing inquisitive passersby, family, colleagues, and friends about storm water.

Volunteers conduct a variety of activities, including

- Analyzing water samples for dissolved oxygen, nutrients, pH, temperature, and many other water constituents
- Evaluating the health of stream habitats and aquatic biological communities
- Inventorying streamside conditions and land uses that may affect water quality
- Cataloging and collecting beach debris
- Restoring degraded habitats.

Citizen monitoring can provide important data and information during the development of a storm water program. These data help determine what management practices and strategies are most appropriate for a particular community or set of issues. State and local agencies can use volunteer data to delineate and characterize watersheds, screen for water quality problems, evaluate the success of best management practices, and measure baseline conditions and trends.

Applicability

Volunteer monitoring programs can be implemented in any community to augment agency-obtained data. Volunteer monitoring programs are organized and supported in many different ways. Projects might be entirely independent (initiated by volunteer groups) or associated with local, state, interstate, or federal agencies. Programs might also be associated with environmental organizations or with schools and universities. Financial support for these programs might come from government grants, partnerships with businesses, endowments, independent fund-raising efforts, corporate donations, membership dues, or a combination of these sources.

Implementation

In general, volunteer monitoring programs work cooperatively with state and local agencies in developing and coordinating technical components. Whenever data are collected for use by state and local agencies, a quality assurance project plan is often developed to provide guidance for volunteer training, sample collection and analysis, and information recording and dissemination. Volunteer groups whose primary goal is education usually implement straightforward assessment methods and do not focus on quality assurance plans.

Benefits

Volunteer programs promote the stewardship of local waters. By educating volunteers and the community about the value of local waters, the kinds of pollution threatening them, and how individual and collective actions can help solve specific problems, volunteer monitoring programs

- Establish a connection between watershed health and the citizens' individual and collective behaviors
- Build bridges among various agencies, businesses, and organizations
- Create a constituency for local waters that promotes personal and community stewardship and cooperation.

Establishing a Volunteer Monitoring Program. If a volunteer monitoring program is not available, a new program can be started. Starting a volunteer monitoring program is not a simple task. Things that will be needed are

- Money for equipment and possibly for staff
- Appropriate meeting, training, and lab facilities
- A network of knowledgeable people (such as educators, extension agents, and local government representatives) who are interested in the project and willing to advise and assist with the efforts
- Connection to or sponsorship by potential data users who can help plan the project to meet their needs as well as those of the new program's
- Organizational skills to manage and maintain the project.

Most of all, time will be needed to make contacts in the community, design a monitoring plan, develop training sessions, recruit volunteers, revise the program as it matures, raise funds, analyze the data, and report back to the volunteers and the community.

Following are some of the lessons learned by other volunteer programs:

- *Start small.* A pilot project that serves to test methods, training sessions, and organizational skills can keep volunteers from being overwhelmed and allows them to evaluate and refine the project before moving on to more ambitious efforts.

- *Keep goals realistic.* Most volunteer data are used to educate the community and to screen for potential problems. Although it is important to strive for data quality, it is also important to realize that for most projects a high degree of data quality assurance is not necessary.

- *Planning pays off.* Few things are more frustrating than collecting a year's worth of data and then finding that the volunteers have no idea how to analyze them, that the methods used are not considered valid, or that sites were sampled in the wrong locations.

- *Make connections.* The more people in the community and within local and state agencies who are aware of the program, the more friends and supporters the program could have. Potential data users should be included in all phases of the project's development.

- *Develop volunteer leadership.* Volunteer leaders within a project provide the vision for setting goals and the commitment to achieve them. They also enable a project to develop and grow without stagnating. Plenty of opportunities for volunteers to develop as leaders should be built into the program.

- *Pamper volunteers.* Volunteers give up their free time to come to meetings, attend training sessions, and trudge out to monitoring sites. Social opportunities should be provided, and volunteers should be rewarded for a job well done.

- *Use the data.* Findings can be reported to volunteers and to the community. Volunteers can present monitoring results at fairs and town meetings or can send findings to appropriate contacts in state and local government. Also, a newsletter or data report can be created to inform the public about what has been accomplished. Volunteers should coordinate with state and local officials to transfer data and analyses. Volunteer groups can present findings at town meetings and prepare reports or brochures to distribute to interested citizens.

Effectiveness

There are two major hurdles to having an effective volunteer monitoring program: recruitment and quality assurance. Advertising volunteer opportunities and facilitating volunteer groups are key to a successful program. Quality assurance can be achieved by providing volunteers with extensive and detailed guidance as well as supervision to produce data of sufficient quality to use in watershed analyses.

Limitations

Volunteer monitoring programs have several limitations. First, getting volunteers to commit is one of the major limitations to any volunteer effort. Initial limitations are obtaining equipment, finding a site or sites, and getting people to volunteer their time, effort, and expertise. Second, because volunteers have no formal water quality sampling training, the quality of the data is questionable even if a quality assurance program plan(QAPP) is followed. There is no guarantee that rigorous sampling protocols will be followed to the letter, especially when sterile procedures are required. Additionally, some data gathering, such as benthic macroinvertebrate sampling and identification, requires a good deal of skill. Extensive training and supervision can help allay these data quality issues, but this can be expensive. However, depending on how the data are used, strict procedures may not be necessary. For example, volunteer monitoring data can be used to target agency sampling by identifying sites with probable water quality problems.

Cost

Volunteer monitoring programs are funded through a variety of sources. In some cases, state and local water quality or natural resource agencies sponsor the volunteers and contribute staff, equipment, and services such as data analysis. Some programs receive funding from federal agencies such as the EPA, the National Park Service, and the U.S. Forest Service.

In addition, many volunteer programs receive private support through foundations, universities and other research centers, or corporate sponsors. This support may include funding for a full- or part-time organizer, equipment, training workshops, or data analysis. Some agencies or organizations also offer support by allowing volunteer monitoring programs to use their facilities and equipment. In many programs, volunteers themselves also help pay for monitoring by purchasing their own equipment and hosting training sessions.

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Reforestation Programs
Public Involvement/Participation

Description

A reforestation program teaches children about the importance of planting trees (Source: Chesapeake Bay Foundation, 2000)

Reforestation is essential to the restoration of many natural habitats. These forested buffers between land and water are an essential part of the ecosystem. In some parts of the country, however, they are disappearing at an alarming rate. Reforestation programs attempt to preserve and restore forested buffers and natural forests. In areas all over the country, volunteers, community groups, and state and local conservation groups have initiated tree planting efforts.

In addition to buffer establishment and improvement with reforestation, municipalities can accomplish several tasks including park improvement, neighborhood and highway beautification, and provision of shade in parking and pedestrian areas. A municipality should determine what their priorities are and identify candidate sites for reforestation based on these priorities.

With the variety of tasks involved in tree planting efforts, everyone can help out. While some people man wheelbarrows, haul the plants, or shovel ground, there are many less-strenuous ways that volunteers can assist in these efforts. For example, to maintain a steady supply of trees, some organizations establish small nurseries where volunteers can pot seedlings and care for them for about 2 years until they are ready to be transplanted to a natural setting. Other participants in a tree planting program might be responsible for contacting local businesses, residences, or nursery farms to seek financial or vegetative donations.

Applicability

Reforestation programs can be used throughout a community to reestablish forested cover on a cleared site, establish a forested buffer along stream corridors to filter pollutants and reduce flood hazards, provide shade and aesthetic benefits in neighborhoods and parks, and improve appearance and pedestrian comfort along roadsides and in parking lots. It is up to the municipality to choose candidate sites for reforestation programs, and these decisions can be based on residents' recommendations or on overall capital improvement goals of the community.

Implementation

Municipalities should determine who will be in charge of a reforestation program. The program can be run by the local environmental department if one exists, but this department needs to have the organizational and managerial capacity to handle such an undertaking. Additional staff may need to be hired to conduct this program. Another option is to solicit volunteer organizations to run the program. The municipality can provide support to these volunteer groups in the form of materials, equipment, staff supervision, and funds for additional expenditures.

Funding for a reforestation program can come from a variety of sources, both public and private. Federal grants are available through USDA (Wildlife Habitat Incentives Program, Forestry Incentives Program, Resource Conservation and Development Program, Small Watershed Program, Watershed Surveys and Planning) and EPA 319(h) funding for nonpoint source demonstration projects, among others). More information about these and other federal grant programs can be found at USDA's Natural Resources Conservation Service web site at *www.nrcs.usda.gov/NRCSProg.html* and EPA's Nonpoint Source Control Branch web site at *www.epa.gov/owow/nps/funding.html*. State funds also might be available for reforestation programs--municipalities should check with state environmental agencies to identify what grant and loan programs are available for this purpose.

Additionally, municipalities can look to private sources of funding. Partnerships can be established with nurseries or with the organizations participating in the volunteer effort. Also, municipalities can solicit contributions from developers and businesses that want to be associated with this endeavor. Finally, citizens can donate money to have trees, groves, or parks named after them.

Once the program and funding are established, the next step is to choose sites suitable for tree planting efforts. Areas of disturbance such as sparsely vegetated streambanks or areas on the periphery of a forest are often ideal for restoration efforts. When the site is selected, it is important to conduct a detailed feasibility study to ensure the success of the tree planting. Each site has unique soil and other environmental characteristics that must be considered when selecting tree species to be planted. To properly assess a site, it is wise to consult a local horticulturist or landscape architect for technical assistance. Park employees, rangers, local scientists, and experts at nurseries and garden stores can also provide advice concerning the types of native tree species that are appropriate under various conditions. Municipalities should develop a timetable for planting depending on program priorities, site conditions, and the availability of materials and labor.

Once the site and tree species are selected and a schedule is set, the municipality should organize an outreach campaign to get the word out about the reforestation program to the public. This outreach campaign can advertise the reforestation program at town meetings or by holding meetings with individuals and groups, such as neighborhood coalitions, that might be interested in participating in a reforestation program. Additionally, if municipalities have a web site or newsletter, the program and volunteer opportunities can be advertised there.

Once volunteers are found, the next step is to secure the materials and equipment needed for tree planting events. Trees for plantings can be donated, purchased commercially, or raised by the group, but note that raising them involves a significant time committment (up to 2 years). A committment is needed from the nursery that the plants will be delivered in a timely manner for the planting.

The site might need to be prepared for planting. This preparation includes clearing any vines or other overgrowth from the planting area. Equipment and supplies also must be collected prior to the planting. For example, shovels, wheel barrels, gardening gloves, pruning cutters, and mulch should be gathered and transported to the site. This equipment can be supplied by the public works department or a local contractor.

With the materials collected and in place, tree planting can begin. Trees and shrubs take about a year to become established in a new environment, during which time substantial root growth occurs. To ensure that trees flourish in their new environment, consult with a horticultural specialist or other expert for detailed planting instructions and specifications. The plant specialist should also recommend maintenance of the newly planted trees, and inspections should be made to identify and repair vandalism if it occurs. Maintenance can be conducted by the municipality or volunteer groups, but a plan and schedule must be in place to ensure that maintenance occurs as scheduled.

Effectiveness

With the proper tools, types of plants, planting, and maintenance, reforestation can be very effective in reducing pollutants in and decreasing the volume of storm water. The nonprofit organization American Forests conducted a study in the Houston area to document urban forest covering a 3.2-million-acre area. They also analyzed 25 specific sites with aerial photography using CITYgreen software to map and measure tree cover and to calculate the benefits of Houston's trees. Study results show that trees provide significant benefits relative to storm water runoff, energy savings, and pollutant removal. The study found that Houston's tree cover reduces the need for storm water management by 2.4 billion cubic feet per peak storm event, saving $1.33 billion in one-time construction costs (ENN, 2001).

Benefits

Pollutants in urban and agricultural runoff, especially sediment that reduces the water clarity, nutrient pollution from fertilizers and manure, and toxics from weed and pest killers, can freely flow into valuable natural water resources without a vegetated buffer along stream corridors and lakeshores. Trees and forested areas reduce runoff through interception and by increasing surface storage and infiltration. The trees mitigate peak flows through storm water retention, provide habitat for wildlife, shade streams to help maintain appropriate water temperatures, and provide aesthetic benefits. Trees are also beneficial in urban areas. Not only are they aesthetically pleasing, but they also provide habitat for wildlife, capture rainfall, and reduce the urban heat index, which in turn reduces the need for air conditioning.

Limitations

Limitations to an effective reforestation program include the costs associated with buying and planting the trees and other vegetation, finding people to install and maintain the plants, and continuing the upkeep of the buffer areas. Weather patterns, such as hurricanes and other storms or droughts, can cause significant damage to reforested areas. These natural weather patterns are unavoidable, but if indigenous vegetation is used, the plants are more likely to survive.

Cost

Reforestation programs involve a variety of costs, especially staff time needed to organize the program, select sites, coordinate supplies, and recruit, organize, and supervise volunteers. Supplies and equipment might also be expensive, depending on the size of the reforestation effort. The cost to the municipality can be minimized by soliciting donations from businesses and private citizens and by obtaining grants and loans from public sources.

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Wetland Plantings
Public Involvement/Participation

Description


A group of people help to plant new wetland vegetation

Wetlands are unique ecosystems that are home to a great diversity of terrestrial and aquatic plants and animals and are beneficial in many ways. They have the ability to improve water quality by filtering and accumulating pollutants, thereby protecting adjacent rivers, lakes, and streams. Wetlands also provide food, protection from predators, and other habitat factors for many of the nation's fish and wildlife species, including endangered and threatened species. Finally, wetlands have economic value associated with recreational, commercial, and subsistence use of fish and wildlife resources.

Over time, many wetland, riparian, and lakeshore environments have become degraded by human-induced disturbances, such as the introduction of invasive, non-native plants. Such exotic vegetation can reduce habitat quality (e.g., loss of food supply), contribute to an unkempt, weedy appearance, and obscure the waterbody from view. These disturbances have not only affected the natural functions of these systems by causing increased erosion, a decline in natural wetland vegetation, and degraded habitats, but they have also reduced the aesthetic value of the environment. Wetlands and waterbodies are also disturbed by land development activities in adjacent areas and in upland areas within the watershed. These disturbances often result in sediment deposition, nutrient enrichment, and increased storm water flows into the wetlands. This causes a reduction in water clarity that ultimately limits the growth of wetland plant species and submerged aquatic vegetation, the smothering of streambeds, contamination of water quality, and alteration of natural hydrology.

Applicability

Municipalities can plant wetland species to both preserve existing wetlands and enhance degraded wetland plant communities. Wetland plantings however, are only one part of what a municipality might undertake when restoring, protecting, or creating a wetland.

When preserving and enhancing degraded wetlands, it is often necessary to plant wetland species along shorelines, in upland habitats, and along the bottom of waterbodies. Each wetland can be divided into specific zones based on soil hydrology. Upland transitional zones are adjacent to normally wet or inundated wetland areas. These zones are extremely important to the health, function, and appearance of the wetland or waterbody. Wetland and open water zones range from having saturated soil below the ground surface (such as in a wet meadow) to being completely inundated with water (such as a shoreline or streambank). These areas can support wetland plant species ranging from sedges and shrubs that are intolerant of inundation to emergent species and submerged or floating plants.

Municipalities can also use wetlands mitigation banking when preserving degredated wetland communities. A wetland mitigation bank is a wetland area that has been restored, created, enhanced, or preserved, and is then set aside to compensate for future wetland conversion from development activities. A municipality can participate in wetland mitigation by undertaking such preservation activities under a formal agreement with a regulatory agency. In Pembroke Pines, Florida, 358 acres of degraded wetlands on city property were restored through the Florida Wetlandsbank. For more information on mitigation and conservation banking, including contact information for local bankers and regulators, contact the Terrene Institute at *www.terrene.org.*

Implementation

When beginning a wetland planting, it is important to keep in mind that any entity that alters a wetland must first get a permit from the U.S. Army Corps of Engineers. This requirement is specified under the Clean Water Act, Section 404.

The first step in a wetland planting program is to determine the history of the site, including previous vegetation and typical conditions. Another important factor is the hydrology of a site. Hydrology defines such factors as average and maximum depth, duration of inundation, and degree of soil saturation. Hydrology establishes the soil and plant conditions that distinguish between different wetland types and streambank and shoreline environments. Municipalities should work with a reputable wetland firm to determine these conditions. Other factors that should be considered for wetland plantings are described below.

Plant species selection. Selection of plants for wetland, streambank, and shore zones is closely tied to the hydrology of the site, particularly water depths and flood durations. Other factors such as shading, water clarity, and salinity should be taken into account as well. Planting in open water areas typically involves the use of tubers, plugs, and potted plants. Planting in nonponded wetland zones often involves both seeds and live plants. Project planners must be familiar with different types of plants that can be used, depending on the site's characteristics. Field tests can be useful to delineate planting zones on a site that contains a range of hydrologic regimes.

It is important to use a diverse mix of wetland plants and not just one type of plant such as *Phragmites* (reed grass) or cattails. These and other aggressive species are very easy to establish but should not be planted. They will outcompete other valuable species and will eventually dominate less robust colonizers.

As wetlands also exist along streams, it is important to establish riparian vegetation in these areas. Riparian vegetation stabilizes banks, provides large woody debris and detritus for aquatic habitat and food, and shades the stream, reducing water temperatures. Reestablishing riparian cover along streams can call for active reforestation of native species, removal of exotic species, or modification of mowing options to allow gradual succession.

The types of vegetation planted should depend upon geographic location, climate, and soil conditions. Species that are native to the area are naturally better suited to its conditions. Riparian vegetation includes grasses, shrubs, and trees. While all of these types of vegetation help stabilize stream banks and filter storm water, their effectiveness varies. For example, deeply rooted plants might work better than certain grasses for transforming nitrogen because the roots can reach deeper flowing water.

Information on native plant species selection, how and when to plant, and other local factors is available from federal agencies, such as the Natural Resources Conservation Service, and from various state and local agencies. A local Cooperative Extension Service is another good source of information.

Initial and long-term management and maintenance. Many wetlands become overgrown with non-native, invasive plant species following a disturbance. Noxious weeds can be controlled in a variety of ways. Controlled burning is a commonly used technique for wetlands, natural streambanks, and shorelines. Timing is important, since these areas burn well only at very specific times of the year. Furthermore, fires in wetland areas can be very intense, especially where cattails and giant reed grasses are present; therefore, special care should be exercised. A 2- to 3-year rotation for prescribed burnings is appropriate.

Invasive species can also be removed by physically extracting them from the site. This process is often difficult because many non-native species grow in dense patches with extensive root systems.

For species that are particularly difficult to eliminate using prescribed burning or physical extraction approaches, chemical control of non-native species is sometimes warranted. Herbicide techniques are different from those used in upland sites, primarily because herbicides have to be licensed for use in or near waterbodies, wetlands, and other aquatic systems. Chemical means of weed reduction should be used only when necessary, and product labels should be read and closely followed. Only a licensed herbicide applicator should conduct this work.

Effectiveness

If hydrologic and soil conditions are conducive to plant growth, wetland plantings often respond very quickly. Extensive cover of native plants often can be achieved during the first growing season. Noxious weed control through the use of mowing or pruning is often necessary during the first several years. Some replanting might also be necessary. A stable, diverse, and aesthetic wetland/riparian landscape might take 3 to 5 years to achieve.

It is important to understand that the success of wetland plants will not be immediate and that the effort does not end with the planting itself. Wetland plants should be routinely monitored following planting. If the plantings do not appear to establish themselves, it is important to reevaluate the site selection and conditions before replanting. With each revegetation effort, new information about suitable habitat and conditions will be gained from both successful and unsuccessful planting attempts.

Benefits

Planting programs can be beneficial to wetlands in several ways. First, these plantings act as a "jump-start" for areas that are bare or significantly disturbed. Although revegetation might not completely cover a disturbed area, it is a means of establishing plant species that can then propagate. By planting indigenous aquatic species, the natural functions of wetlands can be restored, including storm water filtration, nutrient uptake, sediment removal, and peak flow attenuation. Another value of revegetation programs is educating the public about wetland plants and their value. By working on wetland planting projects, the public has a hands-on opportunity to improve wetlands and aquatic environments. Also, wetland planting projects help scientists learn more about which environments and growing conditions promote plant growth. Finally, reestablishment of wetland vegetation improves wildlife habitat for migrating waterfowl, reptiles, amphibians, and other aquatic species. For example, West Eugene, Oregon's, Stream Team and Parks Volunteer programs have resulted in the adoption of wetlands, stream segments, and parks by a number of agencies and organizations in the area (City of West Eugene, Oregon, 2001).

Limitations

The ability of the new plants to succeed depends on several factors, including the weather (drought or flood) and insect damage. Also, upstream or nearby development and land use changes may alter wetland conditions and result in altered salinity, hydrology, or other factors that can lead to die-off of recently planted vegetation. Maintenance is important to ensure that the plantings have successfully established themselves. Other problems associated with wetlands include the filling in of detention ponds that were originally built by developers. When this filling occurs, municipalities should determine whether or not they should convert the ponds into wetlands or return them to their original state.

Cost

Wetland planting programs are often sponsored by local or regional environmental agencies. Many organizations acquire financial support for replanting activities through fund-raising efforts and membership dues. Scientists and wetland experts are often willing to donate their time to conduct site visits and provide recommendations for the plant species selection process.

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Adopt-A-Stream Programs

Public Involvement/Participation

Description

Adopt-A-Stream programs are an excellent public outreach tool for municipalities to involve citizens of all ages and abilities. They are volunteer programs in which participants "adopt" a stream, creek, or river to study, clean up, monitor, protect, and restore. Through these activities, the adopting group or organization becomes the primary caretaker of that stretch of stream in the watershed.

Adopt-A-Stream volunteers help monitor their stream (Source: Kodak, 2001)

Applicability

A municipality can tailor an Adopt-A-Stream program to allow participation from any group or organization within a watershed. Adoptions are as flexible and unique as the streams themselves. Adopting a stream is a great program for youth groups, including church groups, scouts, and school clubs, but it can also be a great activity for adult groups such as neighborhood associations, civic organizations, or businesses. Levels of involvement range from quarterly visual surveys and litter pick-ups to monthly testing to one-time habitat improvement projects. The objectives of the program are not only to remove litter, but also to improve the quality of the stream. Waste collected from stream banks and channels could spur local interest in maintaining and improving the water quality and aesthetics of all local waterbodies.

Municipalities can sponsor many different activities through Adopt-A-Stream programs, such as:

- Implementing stream cleanups
- Conducting streambank surveys
- Monitoring stream insects and gauging water quality
- Executing streambank enhancement projects, such as tree planting, to help control erosion and stabilize streambanks
- Implementing storm drain stenciling
- Conducting construction site surveys for proper storm water controls
- Promoting education about the watershed through stream walks, workshops, and other activities

Implementation

Municipalities can begin an Adopt-A-Stream program by obtaining a watershed map and marking potential stream sites on it. Rough watershed maps can be obtained from EPA's *Surf Your Watershed* web site (USEPA, 2000) at http://www.epa.gov/surf, or more detailed maps can be ordered from the U.S. Geological Survey (2001) at http://mapping.usgs.gov. The watershed map can then be used to keep track of which stretches are adopted and by whom. Once the stream sites have been identified, a monitoring and reporting plan to evaluate the conditions on the stream should be developed.

The next step is to prepare "how to" packets on each activity that can be distributed to interested organizations. Typical packets include

- Instructions and information needed to conduct an activity such as stream monitoring or storm drain stenciling
- Topographic maps of the area (with the stream of interest designated)
- Data sheets for recording observations
- Equipment or lists of necessary equipment (such as bags, gloves, and monitoring devices)
- First-aid kits
- Comments on the stream's history
- Field guides
- Contact information
- A basic "do's and don'ts" list for what to do if hazardous materials like syringes are encountered
- Safety tips
- General hints for a successful cleanup
- Rewards for volunteers (such as stickers or certificates)

For example, a packet for conducting a stream cleanup might include trash bags and gloves, a map designating appropriate trash pickup sites along the stream and private land areas for which special permission might be required, and a list of contact information for trash collectors and recyclers.

Most Adopt-A-Stream programs also require documentation to be completed by their participants. For example, almost all programs call for a registration form to be completed by the group. Items that can be included on the registration form include the group's name, a contact person's name and address, the stream's name and location, a description of the stream stretch with landmarks (e.g., "from High Bridge north to Route 58 overpass"), the length of the stream, and the anticipated number of participants.

Some programs also require forms to be completed for a specific event such as a stream cleanup. A cleanup report should provide a record of the length of the area cleaned, the number of participants, and the amount of litter collected (e.g., the number of bags, total weight, and counts of trash items by category). To save on mailings, a master copy of the cleanup report can be mailed to the participating organization, which can reproduce the report for its members before each cleanup. If the organization keeps the original form and topographic map, trends in litter volume or other stream parameters over time can be noted.

Publicizing the Program and Its Activities. The media should be used whenever possible to spread the word about the Adopt-A-Stream program and the activities it sponsors. Advertisements can be placed in newspapers, public service announcements(PSAs) can be broadcast on TV and radio, and an Internet site can be developed with program information. Community groups and schools should be targeted in the outreach campaign through presentations and assemblies, stressing that the program is educational, philanthropic, and fun.

To help advertise Adopt-A-Stream events, news releases can be sent to local newspapers and radio and television stations before an activity occurs. Contacting the media in advance of a cleanup, storm drain stenciling event, or educational stream walk allows the press to cover the activity as it happens. When the activity is completed, a second news release explaining what was accomplished can be sent to the media.

Partnering with Schools. Many Adopt-A-Stream programs partner with schools to develop interdisciplinary classroom curricula and activities. Through the program, teachers and students adopt a waterway and perform chemical, physical, and biological testing to determine water quality and perform habitat restoration. Participating in such an interdisciplinary program gives classroom learning a real-life application, enhances students' problem-solving capabilities, and provides community recognition of the students' efforts. Teachers can select projects and activities that best match their students' capabilities and the materials and resources available. The national Adopt-A-Stream organization www.adopt-a-stream.org, as well as numerous agencies nationwide, can provide teacher's guides for developing a classroom Adopt-A-Stream program.

Some schools find it valuable to enlist a cosponsor such as a community group or private organization to aid them in their efforts. Cosponsors vary in their involvement with the students. Some activities that cosponsors can undertake include meeting with students to demonstrate community support for their efforts, helping to select an appropriate waterway, providing special information about the waterway, accompanying students on field trips, helping to prepare news releases and articles about the program, providing funds (if necessary), and helping to prepare a written report that compiles all of the data from schools in the watershed. Students and community members can then use this report as a focal point around which to plan strategies for involvement and actions for the coming year.

Effectiveness

The effectiveness of Adopt-A-Stream projects is exemplified by the Northwest Pennsylvania Chapter of Trout Unlimited's Adopt-A-Stream project located on Beaver Run in Erie County, Pennsylvania (NWPATU, no date). Beaver Run is a small meadow brown trout stream in southern Erie County, Pennsylvania. The Pennsylvania Fish and Boat Company designated Beaver Run as a class "A" wild trout water and stopped all stocking of hatchery trout. Over the years, some of the stream was subject to bank erosion caused by livestock grazing, resulting in siltation of pools and loss of habitat. Trout numbers had declined on the lower sections of the stream.

Some members of NWPATU had fished the stream over the years and knew that the stream was in decline. The chapter moved to adopt the lower mile and, with the blessing of the landowners, started project planning. The project would not have been successful without assistance from the Pennsylvania Fish and Boat Company, a cash grant from the National Trout Unlimited Organization, donations of equipment from chapter members, and the hard work of NWPATU and Gem City Fly Tiers members. The project's first phase was to build four wing deflectors, two mud sills, two bank cribbings, and two cattle crossings over a 2-year period. On August 17 and 18, 1996, and July 11 and 12, 1997, the chapter met for 4 days of hard work. The crew completed construction and installation all of the devices outlined in the plans. These restoration efforts would not have been completed without the efforts of the Adopt-A-Stream group.

Another example of a successful program can be found in West Eugene, Oregon. West Eugene has a Stream Team program that provides citizens of all ages an opportunity to learn about the city's water resources and their role in protecting them. West Eugene offers hands-on projects that allow citizens the opportunity to improve water quality (City of West Eugene, 2001). See http://www.ci.eugene.or.us/wewetlands/default.htm for more information on the city's efforts to restore their water resources.

Benefits

The benefits a municipality can achieve by implementing an Adopt-A-Stream program are numerous. Participants of the program help make areas in their watershed more visually attractive and improve habitat for wildlife, thus saving and restoring natural resources. In addition, the hands-on activities and recognition and exposure that schools, private organizations, and the community get when participating in an Adopt-A-Stream program provide a tremendous sense of accomplishment.

Limitations

Commitment is probably the greatest limitation a municipality can face when implementating an Adopt-A-Stream program. Many people sign up for activities but quickly find they do not have time for follow-up activities. This is one reason youth groups are so well suited for these projects. By integrating a stream program into a curriculum or into a yearly scout project, the group's commitment is ensured. Other limitations may include funding availability, weather, equipment maintenance, and liability associated with the dangers of slippery rocks or steep slopes.

Cost

The costs a municipality can incur when implementing an Adopt-A-Stream program would primarily result from the amount of time employees spend administering the program. Significant costs can also be associated with sponsoring an Adopt-A-Stream program. The costs imcurred by sponsors depend on the level of assistance the sponsoring agency contributes to participants in the program, such as providing activity packets, technical expertise, and database management. On the other hand, the cost of participating in an Adopt-A-Stream program is very low. Equipment for monitoring can be borrowed from universities and other research facilities, and activities such as stream cleanups might require only bags, gloves, clipboards, and pencils, which can be provided at low cost. Media coverage of program events is free.

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Involvement/public opinion

Watershed Organization

Public Involvement/Participation

Description

A watershed organization incorporates the ideas and resources of many different groups into a single organization. The groups can consist of local governments, citizens, nonprofit environmental groups, and local universities, among others. The purpose of a watershed organization is to restore, protect, and promote the natural resources of the watershed. To accomplish this, a watershed organization might set goals for and subsequently implement public education and storm water management programs, stream clean-up events, or restoration activities.

Residents and stakeholders attend a meeting of the Russian River Watershed Council in Northern California (Source: Russian River Watershed Council, no date)

Watersheds most likely encompass multiple jurisditions and involve multiple government participants. It is essential for all municipalities that fall within the watershed boundaries to participate in watershed organizations. If a watershed organization is still in the conceptual stage, it will behoove the municipality to help structure it in a way that will serve all interests in the watershed. A municipality cannot--and should not--control a watershed organization, but it can support it, nurture it, and help it achieve its goals.

Applicability

A watershed organization can exist for any watershed, large or small, but organizations for larger watersheds are more common. In all cases where a watershed organization exists, it is crucial for municipalities to be involved in the decisionmaking process so the municipality's goals are achieved. In places where no watershed organization exists, municipalities can initiate the creation of one by working with other stakeholders and interested parties.

Implementation

The creation of a watershed organization results from the cooperation and sharing of ideas of several stakeholder groups, including the municipality. However, a watershed organization must have an organized structure. A constitution and bylaws should be developed, membership and representation defined, and goals and objectives stated.

Guidance is available to help municipalities and other interested parties start watershed organizations. Purdue University's Conservation Technology Information Center (CTIC, no date) developed guidance for watershed organizations, which they term "watershed partnerships," through their Know Your Watershed program, located at *www.ctic.purdue.edu/KYW*.

The watershed organization might sponsor volunteer activities and annual events that involve the general public, school groups, and others in enjoyable, hands-on activities in their watershed. Activities that promote the watershed's quality help citizens learn and appreciate the value of conservation, pollution prevention, and cleanup. Watershed organizations typically sponsor such projects as

- Field trips and tours
- Meetings and workshops
- Canoe trips
- Volunteer monitoring
- Cleanup and restoration days
- Educational programs for schools, civic groups, and other local organizations
- Media relations
- Opinion surveys
- Focus groups (CTIC, no date).

Different members of the watershed organization have different roles. CTIC (no date) recommends that local elected officials

- Provide political leadership and credibility
- Make land use and resource management decisions
- Provide financial support for projects.

They also recommend that local government agencies

- Provide financial and technical support
- Develop policies and make decisions that affect the watershed
- Provide logistical support and equipment
- Collect and analyze data.

Effectiveness

Watershed groups are effective at improving water quality when they are well organized and active and have committed members. For example,in 1996 and 1997, several voluntary, nongovernmental partnerships were honored by CF Industries for their outstanding efforts to protect water quality (Terrene Institute, no date; 1996; 1997; 1998; 1999). The following organizations have received the award:

1996

- Operation Green Stripe (St. Louis, MO)
- French Creek Watershed Advisory Group (Elizabethtown, NY)
- Boquet River Association (Scott River Sub-Basin/Klamath River Basin/Siskiyou County, CA)
- Cheney Watershed Program (South Hutchinson, KS)

1997

- Snowbird Ski & Summer Resort (Snowbird, UT)
- Columbia-Pacific Resource Conservation and Development Council (Aberdeen, WA)
- Grand Traverse Bay Watershed Initiative (Traverse City, MI)
- Heron Lake Watershed Restoration Project (Lakefield, MN)
- Lake Pontchartrain Basin Restoration Program (Metairie, LA)

1998

- Cargill Water Matters Program (Minneapolis, MN)
- French Creek Project (northwestern PA)
- Hillsdale Water Quality Project (Kansas City, MO)
- Indian Lake Watershed Project (west central OH)
- Marin Coastal Watershed Enhancement Project (Sonoma and Marin Counties, CA)

1999

- Sun River Watershed Project (west central MT)
- Friends of the Rappahannock (VA)
- North Branch of the Chicago River Watershed Project (IL)
- Saginaw Bay Watershed Initiative Network (MI)

These programs were selected because they developed innovative, nonregulatory approaches to water quality improvement. More information about these organizations and the National Watershed Award can be found at *www.terrene.org/cfaward.htm*.

Benefits

Watershed organizations can promote a sense of ownership of water resources and improve local awareness of storm water issues. Cleanup and restoration events can benefit wildlife habitat and water quality as well. By forming an organization, each stakeholder gets a voice in the decisionmaking process, which ensures that the final plan represents the consensus of all parties. According to CTIC, watershed organizations also

- Make more efficient use of financial resources
- Create a spirit of sharing and cooperation
- Ensure fairness, which minimizes the potential for negative social and economic impacts
- Result in more creative and acceptable ways to protect natural resources.

Limitations

It takes time and skill to establish partnerships and create an effective watershed organization. Municipalities can not accomplish this on their own--they must rely on other stakeholders to provide input and resources to manage the watershed effectively and with fairness. Motivation and enthusiasm are key to keeping stakeholder participation high. Another limitation for watershed organizations is funding for programs and activities. Organization members should work together to raise money and apply for grants to support these activities.

Cost

Costs for watershed organizations vary with the scope of activities planned for the watershed. Many state and local governments offer grants to watershed organizations. For example, as part of its nonpoint-source pollution control efforts, the Virginia Department of Conservation and Recreation supports, trains, and enhances networking among watershed coordinators by offering information exchange and grants to local projects. Virginia also permits the formation of watershed improvement districts with taxing powers. The Lake Barcroft Watershed Improvement District in Falls Church, Virginia, is an excellent example of a successful watershed organization that gets its funding from tax revenues.

Federal grants are available through USDA and EPA to fund certain types of watershed activities. More information about these and other federal grant programs can be found at USDA's Natural Resources Conservation Service web site at *www.nrcs.usda.gov/NRCSProg.html* and at EPA's Nonpoint Source Control Branch web site at *www.epa.gov/owow/nps/funding.html*.

Additionally, watershed groups can hold fund-raising events, sell T-shirts with their logo and slogan, or hold raffles. The money generated by these activities can pay for activities, field equipment, and other necessities.

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Stakeholder Meetings

Public Involvement/Participation

Description


A group of stakeholders meets to discuss important issues affecting their watershed

Public involvement and public participation naturally require the inclusion of stakeholders. Stakeholders are individuals or groups in the community that are most affected by a municipality's storm water program. They have a vested interest in the waterbody and storm water activities. Stakeholders might include citizens, local school groups, community leaders, local and state government representatives, and business owners in the watershed. Stakeholder meetings can be in the form of a local storm water management panel, a public meeting, or any type of interactive, information-sharing event.

Applicability

Each stakeholder has a vested interest in solving storm water management problems for the particular waterbody. Therefore, stakeholders should be informed of water quality issues in their community and solicited to contribute their ideas and concerns. One way to do this is through stakeholder meetings, where participants can hear what others have to say and can contribute their own ideas.

In addition to inviting the stakeholders, representatives from several local newspapers, radio stations, and television news departments should be included. Journalists, broadcasters, and others who attend the meetings can let others know what happened, when the next meeting is, and how they can get involved.

Implementation

The first step for a municipality is to determine which citizens are most affected by the storm water program. Stakeholders will need to be identified by whether they live or work in the watershed or by their activities. Involving stakeholders in the storm water program can be an important first step in forming a watershed organization. To identify stakeholders, an attitude survey can be conducted that seeks to answer the following questions:

- Is a certain segment most affected by the cost of implementing the storm water program?
- Will a segment of the community (perhaps Hispanic immigrants) have difficulty understanding what the whole program is all about?
- Will the municipality find support among environmentalists?
- Does a segment of the community object to government intrusion as demonstrated by the storm water regulations?
- Has the municipality established good working relationships with large industries in the community that also have storm water permits?
- Is the community already part of a strong watershed organization? (If a watershed organization exists, then this group can form the core of the audience for stakeholder outreach.)

Once stakeholders have been identified, the municipality must decide how to approach them. Flyers and media stories can be used to educate stakeholders and to prepare them for a public meeting. Municipalities might also choose to speak before homeowner, civic, and business groups or to contact a strong watershed organization, if one exists.

After the stakeholders have been educated about the issues, a meeting can be held. The municipality should work with community groups to organize the meeting. If the meeting is to successfully involve stakeholders in the storm water program, the first meeting will set the tone for many others to follow. Rules for conducting the meeting must be agreed upon and can be addressed with the following questions:

- Will the meeting be facilitated?
- Will decisions be made by consensus?
- What approach will the group take?

Once the meeting has been organized, an appropriate meeting place must be chosen. Then the word must be put out to the invited stakeholders through mail, Internet, word of mouth, flyers, and/or posters. Someone will need to be the designated leader of the meeting so that it will be organized.

Since the audience will be diverse and at all levels of scientific knowledge, some of the best ways to disseminate information at stakeholder meetings is through graphics like photographs and charts. Storm water management uses a lot of technical terms, such as "*watershed," "runoff," and "nonpoint source pollution*." A glossary of commonly used terms might be displayed on a flip chart or as an overhead, or it could be provided on a handout given to participants before the meeting starts.

A question and answer period and a time for comments should be planned. It is often difficult to get people to speak in public, but it is a good way for them to express their opinions and concerns. Someone else might hold the same ideas or might not have thought of these new ideas. When questions are asked or comments are made, it is vital that the meeting leader listen carefully, not interrupt, and acknowledge the point(s) made. When giving information, the leader must be sure to be descriptive, nontechnical, and up-front. One of the most important things for the leader to remember is to be straightforward and to answer every question. If the leader is unsure of the answer, he or she can promise to look into it before the next meeting and come to that meeting with an answer.

Some topics that might be addressed at a stakeholder meeting include the following:

- Summary of previous meetings
- Announcements
- New tasks to be undertaken
- Selection of various leadership roles (if necessary), such as volunteer coordinator, minutes recorder, or graphic artist
- Creation of committees (if necessary)

A local storm water management panel might be chosen from the attendees. This panel could consist of representatives from the municipalities in the watershed as well as citizen and business representatives. The roles of the panel could include policy writing and meeting organization.

After the meeting has ended, it is important for a municipality to be careful about relying on the media to inform the public of what happened at the meeting. The media may report only on disagreements or discussions that are more sensational than substantive. The media can also intimidate people from speaking for fear of being quoted and encourage others to dominate the discussion for the same reason.It can be useful for the meeting leader to prepare a news release that summarizes the results of the meeting and to distribute it to the local media within the next day or two.

Effectiveness

The effectiveness of a stakeholder meeting is a function of its overall organization. It is more likely that assignments will be accomplished if meetings are conducted in an orderly manner. Sometimes the issues might be controversial or might negatively affect some of the participants. These matters should be handled as professionally as possible so that no one leaves a meeting feeling disregarded. It should be made clear that not all issues will be solved and maybe not everyone will be satisfied, but together the stakeholders can come up with the best compromise.

To be effective, stakeholder meetings must be attended. Finding an appropriate location for the meetings, such as a local school auditorium or a public library, is vital. The location must be easily accessible, able to accommodate the applicable number of participants, and equipped with the appropriate resources, such as outlets for projectors, speakers for microphones, and tables and chairs.

Most important is the time the meetings are held. If the stakeholders work during the day, it could be difficult for them to make a mid-morning or early-afternoon meeting. Typical commutes must also be considered. If the meetings are to be held in a suburban community and most people in that community work in the city and travel a considerable distance each way, adequate commuting time must be allowed. If the meeting is held during dinner hours, it would be appropriate to serve refreshments. The better the timing and location, the easier it is for people to attend.

Benefits

One of the greatest benefits of stakeholder meetings is the accumulation of ideas from people of all backgrounds and all interests. Some participants will be more knowledgeable than others, and they can share their expertise with the other stakeholders. In some cases, stakeholders might belong to other groups with overlapping concerns. In such cases, resources can be pulled together to achieve corresponding goals.

Limitations

Determining who to include and who to eliminate as potential attendees stakeholders could be a limitation. People who are not inherently affected by the storm water management activities should not be included because they could draw the group's attention away from the real issues. Other limitations include finding an appropriate location and time to meet, costs associated with planning and holding meetings, and keeping the stakeholders organized and focused enough to get items accomplished.

Cost

The costs associated with stakeholder meetings revolve around planning and conducting the meetings. The flyers, mailings, or other means of announcing the meeting incur costs for design, production, copying, and distribution (e.g., stamps and envelopes). There also might be rental fees for a meeting location. Producing and distributing minutes of meetings might involve additional costs.

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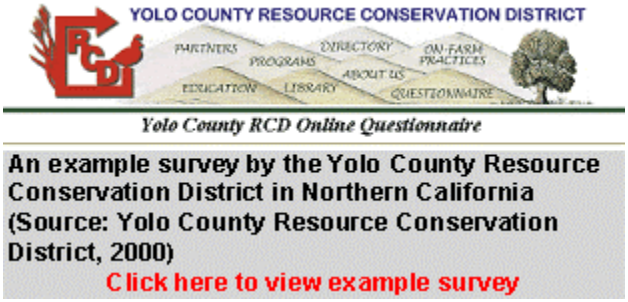
Attitude Surveys

Public Involvement/Participation

Description



Surveys of how the public perceives storm water management can foster better planning and management programs. The results of these attitude surveys can enlighten both storm water managers and the public on what the sources of pollution are, the effects of storm water on the environment, and options for control. Public attitude surveys can bring to light what is important to the stakeholders. Program planners can use this information to determine how best to incorporate the public's needs and desires into the overall goals of any storm water management program.

Applicability

Attitudes toward storm water and the best management practices used to manage it can influence the effectiveness of control measures and clean-up efforts. Determining public perceptions, expectations, and desires is an important place to start. Attitude surveys of interested parties can enlighten storm water managers about the appropriate steps to take and the misconceptions to fix.

Implementation

The first step of an attitude survey is to determine who should be surveyed and how. People who could be surveyed include the residents of particular communities, local business owners and operators, schoolchildren, and other groups. Surveys should be tailored to the municipality's various population segments to account for demographic shifts by age, ethnicity, and income. This may require several types of surveys and languages to ascertain true attitudes. People could be surveyed by mailing each individual a paper survey to complete and return. They can also be interviewed at strategic locations throughout the community, e.g., at the public library or at several shopping centers. An electronic survey could be developed and placed on the Internet, or telephone surveys could be conducted. There are also many different statistical methods for surveying, and one type of method should be chosen. In some cases, one survey may not be sufficient. As cities change, surveys may need to be updated periodically.

Once the groups to survey and the best method to survey them have been determined, it should be decided what questions to ask. A municipality can determine what information it needs to know by addressing the following questions:

- Have citizens complained about new restrictions caused by the storm water program?
- Do people even know what storm water means?
- Is the municipality about to raise sewer rates (as a result of the storm water regulations)?

The *Upper Mississippi River Resource Book* (MacWilliams Cosgrove Snider Smith Robinson, 1996) is a good resource for determining what types of questions to ask. It presents the results of several public attitude surveys on public perception of the Upper Mississippi River and its tributaries. Some of the issues covered by these surveys are listed below. Questions about these and other issues could be included in a storm water public survey.

- Agricultural activities
- Forestry management
- Changes in a waterbody's hydrology
- Recreation
- Public needs
- Property rights
- Sources of pollution
- Present and past water quality
- Wetlands

Municipalities might need professional help in preparing and conducting surveys. Such help is available from local colleges and extension services. EPA also provides survey help in *Understanding a Sense of Place: A Guide to Analyzing Community Culture and the Environment* (USEPA, 2001), a resource which is pending publication in early 2001.

The Florida Department of Environmental Protection's Division of Marine Resources conducted a series of surveys to help strategize its Outreach and Education Plan. Questionnaires were developed for a mail survey of randomly selected employees and for a telephone survey of Florida residents, licensed boaters, and licensed saltwater anglers. The results of these surveys helped the Division formulate its goals to educate and inform Florida residents about marine resources (Duda and Young, 1996).

After a predetermined date for the end of the survey, the results of the returned surveys should be compiled and analyzed. Once the results have been summarized, they can be used in instructional materials to educate citizens and business owners in the area or they can be used in a municipality's annual report to show change and improvement over the year. The local government, area environmental groups, and others might use the results to develop plans for future efforts to manage storm water more effectively.

Effectiveness

The effectiveness of any survey depends on several factors, including the length of the survey, the ability of the recipient to understand the questions, the time needed to complete it, the cost (if any) to return it, and public interest in the topic. The more straightforward the questions and the easier it is to answer them, the better the response will be. In other words, multiple questions should not be asked on the same issues, and the questions should be brief and to the point. If mailed surveys are used, placing return postage on them encourages people to return them.

Benefits

One of the benefits of conducting a public attitude survey is to find out what people really think about an issue. It also allows a person not normally involved in an issue, but a stakeholder nevertheless, to voice an opinion. Attitude surveys are also helpful in targeting public education, awareness, and information programs. By understanding what the public perceives and wants, a municipality can better implement storm water management into the community.

Limitations

The greatest limitation of any survey is its level of response. Response level encompasses the number of completed surveys returned, the number returned incomplete, and the number returned after the predetermined end date for responses. The validity of the responses, therefore, is also a limitation.

Cost

The costs associated with an attitude survey depend on its type. A survey mailed to every resident of a county, for example, would be more expensive than a survey sent to a randomly selected sample. Furthermore, if the surveys to be returned are pre-postage-paid, the cost is greater. A survey conducted on the Internet, perhaps on the municipality's home page, would cost little to nothing. Its statistical validity, however, would be questionable because it would be hard to control repeat respondents and responses by nonstakeholders.

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Community Hotlines

Public Involvement/Participation

Description

Posters and magnets can be used to publicize hotlines

Because regulators and authorities cannot monitor all waterbodies at once, they sometimes rely on the public to keep them informed of water polluters. Community hotlines provide a means for concerned citizens and agencies to contact the appropriate authority when they see water quality problems. A hotline can be a toll-free telephone number or an electronic form linked directly to a utility or government agency, such as the water quality control board. A typical call might report a leaking automobile, concrete wash-out dumped on the street, paint in a creek, or organic debris (including pet waste) in a drainage system or waterway.

Applicability

Generally, an investigation team promptly responds to a hotline call and, in most cases, visits the problem site. If a responsible party can be identified, the team informs the party of the problem, offers alternatives for future disposal, and instructs the party to resolve the problem. If the issue is not resolved by the responsible party (or the party cannot be identified), the proper authority takes action to remediate the situation and prevent future violations.

Implementation

A municipality must first determine whether they need a hotline and, if so, whether the hotline is needed immediately or in the near future. A city can identify their need for a hotline by addressing the following questions:

- Does the city receive frequent phone calls for information about water bodies and stream pollution?
- Are there frequent complaints?
- Are there any anticipated construction or other projects in the city?
- Are there any new ordinances or regulations?
- Does the city currently use a "hit or miss approach," in which whoever picks up the phone deals with the situation?

Once a city has determined that they need a hotline, they should choose between a telephone or an e-mail hotline. A city might decide to do both, at least for a short period of time.

To establish a storm water pollution hotline, a party or agency responsible for maintaining the hotline and responding to incoming complaints must first be identified. The responsible party could be a division of local government, a water quality board, a public utility, or an environmental agency. If the city chooses to use its own staff, it should keep in mind that the staff will require training. The city could also contract with a professional hotline provider. Once the party has agreed to maintain the hotline, it will need to establish a telephone number (preferably toll-free and to be used solely to report pollution complaints) and/or Internet site to receive notification.

All distributed materials should include pollution hotline numbers and information. Typically, hotlines are advertised on public education materials concerned with water quality, such as flyers, door hangers, and brochures. The hotline could also be publicized on "permanent" materials such as bumper stickers and refrigerator magnets, where the number can be retained and easily located.

Hotline costs can be minimized by staying a step ahead of questions and by developing close liaison with city staff to anticipate information needs. Cost estimates can be obtained by comparing the costs of training city staff and using a professional hotline service. A cost comparison should also be made between a person and an e-mail presence for the hotline. Municipalities can obtain specific information about establishing and running a hotline by interviewing contractors who specialize in operating hotlines.

Seattle, Washington, Hotline. The city of Seattle, Washington, provides an on-line "Surface Water Quality Complaint Form" to allow concerned citizens to file e-mail reports of pollutant discharges to the city's creeks, lakes, and storm system. The form includes spaces for information about the person making the complaint and the alleged violation. If worried about privacy, a reporter can submit the complaint by telephone. It is the policy of the city of Seattle to keep the identification of callers confidential, pursuant to the provisions of the Washington Public Information Act.

Seattle Public Utilities surface water quality field investigators respond to water quality-related complaints within the city's limits. When the team responds to a complaint, they make every attempt to determine the responsible party and inform them of the environmental impact of their actions. The responsible party is required to stop the action that is polluting the surface water. Staff members provide information on cleanup, alternative disposal options, erosion control, and other best management practices (City of Seattle, 1999).

Charlotte, North Carolina, Hotline. Over the past 6 years, the city of Charlotte, North Carolina's, local storm water hotline (336-RAIN) has received 20,000 phone calls concerning water quantity and quality problems. The hotline not only helps the city respond to flooding, spills, and dumping incidents, but also provides a rough indicator of the success of public education efforts. Hotline activity increases significantly after educational materials are mailed. Callers can also receive free educational materials through the hotline number. The city also advertises for the county's water quality hotline (Lehner, 1999).

Effectiveness

A storm water hotline is effective when its number is easily remembered (i.e., has a catchy name) or is easily accessible. Most important, however, is the responsiveness of the hotline. If a citizen reports an illegal dumping but no action is taken by the appropriate authority, that citizen could lose faith in the hotline and might not call back with future information.

Benefits

A hotline can serve as a link between the citizens and the municipality's government. It can be an avenue for citizens to feel more involved in their community. It also can be a great way to catch illegal polluters or to stop accidental spills that might otherwise go unnoticed.

Limitations

There are several limitations to community hotlines. The first is the community's ability to pay for it. The second is the ability of the community to keep the hotline staffed. Finally, the hotline must be advertised in order for the effort to be successful.

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